

of Fig. 2 immediately preceding the paragraph in question on page 3 at lines 29-30 and the description of Fig. 4 immediately following in the first full paragraph at the top of page 4 in lines 2-3. The requested amendment provides a numeral for clarification purposes as it appears to have been inadvertently omitted from the specification as originally filed.

2. Claims

Claims 1, 8 and 9 are amended in order to more clearly define and point out that which the inventors regard as their invention. Support for the requested amendments to Claims 1 and 9 may be found in the specification as filed on page 4, in line 28 and on page 5, in line 6. Support for the requested amendment to Claim 8 may be found in the specification as filed on page 5, in lines 15-16.

None of the foregoing amendments add substantive matter to the original specification, and are requested mainly for purposes of reference and/or clarification.

THE INVENTION

The present invention provides an improved liquid aqueous hard surface cleaner. Application of the cleaning composition to hard surfaces, in particular vitreous surfaces, results in the ability of the surface to repel and withstand soiling and staining. The aqueous liquid hard surface cleaner comprises a water-dispersible fluoropolymer that has a molecular weight of at least 5,000 Daltons, in addition to a surfactant. Incorporating the high molecular weight fluoropolymer in the cleaning compositions of the present invention surprisingly provided increased resistance to hard water staining and provided the added benefit of at least a 10% decrease in required drying times as compared to cleaning compositions without a high molecular weight fluoropolymer. Water is the principal ingredient of the aqueous hard surface cleaner, comprising 50% by weight or greater of the formulations. The hard surface cleaner may also optionally contain a quaternary ammonium compound in addition to a chelating agent/buffer.

FIRST OBJECTION UNDER 35 U.S.C. §102

In the Office Action dated 27 March 2002, the Examiner rejected Claims 1-9 under 35 U.S.C. §102(e) as being anticipated by Cheung, *et al.* (U.S. Pat. No. 6,306,810), stating: "as this reference (Cheung) meets all material limitations of the claims at hand, the reference is anticipatory." The Examiner also alleged that, "no parameters were set forth to define what is meant by a fluoropolymer." For the reasons set forth below, Applicants respectfully disagree

with the Examiner.

In order for a rejection under 35 U.S.C. §102(e) to be appropriate, “a single source must contain all the elements of the claim.” *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986). For the following reasons, Applicants maintain that the first objection under §102(e) based on Cheung is in error and must be withdrawn.

At the time that the present invention was filed, a principal source of fluorinated hydrocarbons in the United States was E.I. du Pont de Nemours and Company. Although Applicants claim fluoropolymers and Cheung describes fluorosurfactants, the latter were available from DuPont™ as Zonyl® FSA, FSN, FSO (the Cheung fluorosurfactant) and FSP. Based on published literature, maximum molecular weights for the foregoing DuPont™ Zonyl® compounds are: 1210.2 Daltons, 2217.15 Daltons, 1538.73 Daltons and 1835.24 Daltons for Zonyl® FSA, FSN, FSO and FSP, respectively. (See Exhibits A-D, respectively, attached.) None of the foregoing DuPont™ Zonyl® fluorosurfactants have molecular weights *even close* to the 5,000 Daltons recited by Applicants. And the maximum molecular weight for FSO (from Cheung) is *less than one third* the weight recited by Applicants.

Moreover, on page 4, in lines 30-32 of the specification as filed, Applicants specifically state that the fluoropolymers suitable for use in the present invention are to be *distinguished from* the *much smaller* fluorosurfactants described in Nayar, *et al.*, Can Pat. 2,201,406 (Nayar)” (emphasis added). Indeed, the fluorosurfactants cited in Nayar (*see* p. 5, last paragraph) include the DuPont™ Zonyls® mentioned above, in addition to Zonyls® FSP, FSE, UR, FSJ, FSO-100, FSN-100 and TBS. Chemical formulas for the foregoing are provided at p. 6 of Nayar. The greatest molecular weight among any of the compounds cited by Nayar on pp. 5-6 is still less than half that recited by Applicants.

In light of the foregoing, Applicants assert that the rejection of Claims 1-9 under 35 U.S.C. §102(e) based on Cheung must fail, and that independent Claims 1 and 9 and the claims dependent thereon are allowable as herein amended. Favorable reconsideration of Claims 1-9 is therefore respectfully requested.

SECOND OBJECTION UNDER 35 U.S.C. §102

Claims 1-5 and 7-9 of the present invention were rejected under 35 U.S.C §102(e) in the Office Action dated 27 March 2002 as being anticipated by Yeggy, *et al.* (U.S. Pat. No. 6,258,772). The Examiner stated: “Yeggy, *et al.*, teach hard surface cleaners comprising

fluorosurfactants,” and furthermore indicated that Yeggy teaches a fluorophosphate surfactant. The Examiner’s arguments must fail for the reasons set forth below.

In order for a rejection under 35 U.S.C. §102(e) to be appropriate, “a single source must contain all the elements of the claim,” (*Hybritech, vide supra*). Yeggy teaches fluorophosphates which, even if the heaviest compound was selected for use, would only provide a molecular weight of about 1,000 Daltons. By contrast, Applicants teach and recite fluoropolymers having a molecular weight of above 5,000 Daltons as discussed above, which is nearly *five times* the molecular weight of Yeggy’s fluorophosphate.. Yeggy must therefore fail as a reference upon which to sustain a §102(e) rejection.

Withdrawal of the §102(e) rejection based on Yeggy and reconsideration of the claims as herein amended is respectfully sought.

THIRD OBJECTION UNDER 35 U.S.C. §102

In the Office Action dated 27 March 2002, the Examiner rejected Claims 1-5 and 7-9 under 35 U.S.C. §102(b) as being anticipated by McCleod (U.S. Pat. No. 4,847,004). The Examiner stated: “McCleod teaches a hard surface cleaner comprising fluorosurfactants (see abstract)...”and stated that “McCleod “meets all material limitations of the claims at hand...” For the reasons set forth below, Applicants maintain that the objection under §102(b) based on McCleod is in error and must be withdrawn.

In order for a rejection under 35 U.S.C. §102(e) to be appropriate, “a single source must contain *all* the elements of the claim,” (*Hybritech, vide supra*, emphasis added). First, Applicants maintain that McCleod does not teach a fluoropolymer. McCleod relates to a potassium fluorinated *alkyl carboxylate* (KFAC; see the Abstract, columns 1-4, 7 and Claim 1, etc.). Second, as herein amended, Applicants claim a fluoropolymer having a molecular weight above 5,000 Daltons. This limitation is missing from McCleod.

As McCleod does not contain all the elements of Applicants’ claim as amended herein, the rejection under 35 U.S.C. §102(b) based on McCleod must fail. Withdrawal of this rejection and reconsideration of the claims is now requested.

FOURTH OBJECTION UNDER 35 U.S.C. §102

At page 3 of the Office Action dated 27 March 2002, the Examiner rejected Claims 1-9 under 35 U.S.C. §102(b) as being anticipated by Sokol (U.S. Pat. No. 4,020,016), alleging that Sokol teaches hard surface cleaners comprising fluorosurfactants, and that Sokol, “meets all material limitations of the claims...” Applicants maintain that the Examiner is in error and that

the §102 objection must be withdrawn.

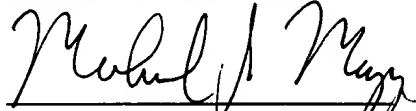
In order for a rejection under 35 U.S.C. §102(e) to be appropriate, “a single source must contain all the elements of the claim” (*Hybritech, vide supra*). Sokol does *not* teach hard surface cleaners comprising fluorosurfactants. Sokol describes fluorocarbon *wetting agents* (col. 3, line 47 and col. 6, line 40). The only reference to a fluorocarbon surfactant in Sokol is DuPont™ Zonyl® FSN which, for reasons cited above, does not contemplate Applicants’ fluoropolymers. And finally, Sokol nowhere teaches or describes fluoropolymers, fluorosurfactants or fluorocarbons having molecular weights at or above 5,000 Daltons as do Applicants.

For the foregoing reasons, Sokol does not anticipate Applicants’ invention, and therefore the rejection under 35 U.S.C. §102(b) must fail. Withdrawal of this rejection and reconsideration of the pending claims as amended herein is therefore respectfully urged.

CONCLUSION

Applicants maintain that the claims, as herein amended, are novel and not anticipatory over the cited art. Favorable consideration is respectfully requested. If the next action of the Examiner is other than to allow the claims, the favor of a brief telephonic interview is requested.

Respectfully submitted,



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AMENDMENT TO THE SPECIFICATION AND CLAIMS
WITH MARKINGS TO SHOW CHANGES

AMENDMENTS TO THE SPECIFICATION

1. On page 3 at lines 31-32, in the last partial paragraph on the page:

Fig. 3 is a color photograph showing an iron stained vitreous surface (toilet bowl) after yet another treatment with a commercial toilet bowl cleaner after

AMENDMENTS TO THE CLAIMS

- Claim 1. **(1X amended)** An improved liquid aqueous hard surface cleaner, comprising:
- (a) a water-dispersible fluoropolymer having a molecular weight of [no less than] at least 5000 Daltons;
 - (b) a surfactant; and
 - (c) a chelating agent/buffer; [and]
 - [(d) the remainder, water].
- with the balance, water.

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- Claim 8. **(1X amended)** A method for imparting resistance to [a vitreous hard surface against staining via] hard water[,], staining to a vitreous surface, comprising contacting said [hard] vitreous surface with the hard surface cleaner of claim 1.

- Claim 9. **(1X amended)** An improved liquid aqueous hard surface cleaner, comprising:
- (a) a water-dispersible fluoropolymer having a molecular weight of [no less than] at least 5000 Daltons;
 - (b) a surfactant; and
 - (c) a chelating agent/buffer; [and]
- with the remainder, water;
wherein said hard surface cleaner has at least 10% faster dry times.

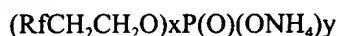
DuPont™ Zonyl® FSP

Fluorosurfactant

Description

Zonyl® FSP is a water-soluble, anionic phosphate fluorosurfactant that gives low aqueous surface tensions with minimal foaming. In many applications, Zonyl® FSP functions as a defoamer. Zonyl® FSP is particularly effective at increasing the water wettability of solid-air and -liquid interfaces. Applications for the outstanding wetting performance of Zonyl® FSP include hair and personal care products, floor waxes, paints and finishes, adhesives, metal and mining operations. Zonyl® FSP is soluble to at least 2% in most alcohols. Due to the phosphate group, Zonyl® FSP is most effective in soft water applications where polyvalent cations are absent.

Structure



where Rf = F(CF₂CF₂)_z

x = 1 or 2

y = 2 or 1

x + y = 3

z = 1 to about 7

Applications

Low Foam/Antifoam

Decreases or eliminates foaming tendency in waxes, paints, adhesives, and other aqueous-based products.

Paints and Coatings

Improved antisoiling, enhanced surface gloss, antifogging, UV resistance, anti-blocking, compatible with most aqueous-based paints.

Polymers

External lubricant, mold release, calcium scale remover, antifogging, reduced plasticizer migration, coupling agent for fillers, UV resistance, antisoilant.

Adhesives

Improved wetting, compatible with most aqueous-based adhesives.

Waxes and Polishes

Improved wetting, enhanced leveling, reduced cratering, compatible with most aqueous-based waxes and polishes.

Metals and Electronics

Improved etching efficiency and plating bath aid. Flash corrosion resistance, rinse aid.

Caulks

Improved UV stability, antisoiling, and weatherability, compatible with most aqueous-based caulks.

Physical Application Properties

Solubility

- >2% in water and methyl alcohol
- 0.7% in isopropyl alcohol
- 0.1% acetone
- Insoluble in ethyl acetate, THF, n-heptane, methyl chloroform, and toluene

Specific Gravity at 25°C (77°F)

- 1.15

Density at 25°C (77°F) (lb/gal)

- 9.6

Zonyl® is a registered trademark of DuPont.

Surface Tension in Deionized Water at 25°C (77°F)

- 42 dyn/cm at 0.001% active ingredient
- 24 dyn/cm at 0.01% active ingredient

Foaming/Defoaming

- Effective defoamer but not effective as a foamer
- Ross Miles Foam Volume, mL at 41°C (106°F)

	DI Water	300 ppm Ca
Initial	35	NA
10 min	25	NA

Emulsifying (especially Halogenated Materials)

- Moderately effective

Wetting

- Highly effective

Detergency

- Moderately effective

Dispersing (especially Halogenated Materials)

- Effective

Compatibility

- Effective only in solutions with low hard ion (polyvalent cation) concentrations

Product Properties

Appearance

Brown liquid. Mix thoroughly to ensure representative sampling.

Ionic Character

Anionic, phosphate salt

Molecular Weight

~600

Composition

35% fluorosurfactant, 20% isopropyl alcohol, and 45% water

Flash Point

24°C (75°F) (Pensky Martens Closed Cup).
Flammable liquid

pH

6<pH<8

Stability

- Stable to freezing. Heating not recommended (see Flash Point data above)
- Chemical stability: 2<pH<12
- Performance stability: 2<pH<12
- Shelf life: 2 yr

Availability

2-oz samples: 8- and 40-lb containers

Personal Safety, First Aid, and Storage and Handling

See the Material Data Sheet (MSDS) for product specific information. Mix well before using.

Technical Assistance

For help in selecting or evaluating these products for your application, please call DuPont's technical service experts at 800-255-4596.

Ordering Information—Product, Literature, or Samples

To place an order for DuPont Zonyl® FSP, call DuPont Performance Chemicals Customer Service toll free at 800-441-9140. For additional literature or a product sample, call 800-255-4596. For locations outside the United States, contact the local DuPont representative in your country.

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[Replaces: H-49018-1]
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EXHIBIT A

DuPont™ Zonyl® FSN

Fluorosurfactant

Description

Zonyl® FSN is a water-soluble, ethoxylated non-ionic fluorosurfactant that modifies surface energies at very low concentrations. Zonyl® FSN is particularly effective at increasing the water wettability of solid-air and -liquid interfaces, particularly in increasing the wettability of low energy polymer and fluoropolymer surfaces. The diffusibility of Zonyl® FSN from the bulk to the surfaces of caulks, paints, and coatings provides superior weatherability, resistance to soiling, and UV stability.

Structure



where $\text{Rf} = \text{F}(\text{CF}_2\text{CF}_2)_y$

$x = 0$ to about 25

$y = 1$ to about 9

Applications

Graphic Arts

Pigment compatibility in inks, improved cylinder life in print equipment, and better print definition.

Paints and Coatings

Improved antisoiling, antifogging, UV resistance, compatible with most aqueous- or solvent-based paints.

Polymers

External lubricant, antifogging, reduced plasticizer migration, coupling agent for fillers, UV resistance, antisoilant, compatible with most aqueous- or solvent-based polymers.

Adhesives

Tackifier modification, improved wetting, compatible with most aqueous- or solvent-based adhesives.

Waxes and Polishes

Improved wetting, leveling, reduced cratering, compatible with most aqueous- or solvent-based waxes and polishes.

Metals and Electronics

Improved etching efficiency, plating bath aid, and zinc battery scale inhibitor.

Caulks

Improved UV stability, antisoiling, and weatherability, elimination of silicone bleeding, compatible with most aqueous- or solvent-based caulks.

Physical Application Properties

Solubility

- >2% in water, isopropyl and methyl alcohol, acetone, ethyl acetate, and THF
- Insoluble in toluene, n-heptane, and methyl chloroform

Specific Gravity at 25°C (77°F)

- 1.06

Density at 25°C (77°F) (lb/gal)

- 8.8

Surface Tension in Deionized Water at 25°C (77°F)

- 29 dyn/cm at 0.001% active ingredient
- 24 dyn/cm at 0.01% active ingredient

Zonyl® is a registered trademark of DuPont.

Foaming/Defoaming

- Effective foamer
- Ross Miles Foam Volume, mL at 41°C (106°F)

	DI Water	300 ppm Ca
Initial	145	135
10 min	135	130

Emulsifying

- Effective

Wetting

- Highly effective

Detergency

- Not effective

Dispersing

- Effective

Compatibility

- Widely effective in solutions with high or low pH and high or low hard ion concentrations

Product Properties

Appearance

Brown liquid with some sediment. Warm the product, and mix thoroughly to ensure representative sampling.

Ionic Character

Nonionic

Molecular Weight

~950

Composition

40% fluorosurfactant, 30% isopropyl alcohol, and 30% water

Flash Point

22°C (72°F) (Pensky Martens Closed Cup).
Flammable liquid

pH

6<pH<8

Stability

- Stable to freezing. Heating not recommended (see Flash Point data above)
- Chemical stability: 2<pH<12
- Performance stability: 2<pH<12
- Shelf life: 2 yr

Availability

2-oz samples: 8- and 40-lb containers

Personal Safety, First Aid, and Storage and Handling

See the Material Data Sheet (MSDS) for product specific information. Mix well before using.

Technical Assistance

For help in selecting or evaluating these products for your application, please call DuPont's technical service experts at 800-255-4596.

Ordering Information—Product, Literature, or Samples

To place an order for DuPont Zonyl® FSN, call DuPont Performance Chemicals Customer Service toll free at 800-441-9140. For additional literature or a product sample, call 800-255-4596. For locations outside the United States, contact the local DuPont representative in your country.

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EXHIBIT B

DuPont™ Zonyl® FSO

Fluorosurfactant

Description

Zonyl® FSO is a sparingly water-soluble, ethoxylated nonionic fluorosurfactant that gives exceptional low aqueous surface tensions at concentrations as low as 0.002% (20 ppm). Zonyl® FSO is soluble to at least 2% in many organic solvents. Zonyl® FSO is a particularly effective additive to adhesives, paints, and coatings for providing external lubricity. The diffusibility of Zonyl® FSO from the bulk to the surfaces of caulks, paints, and coatings provides superior weatherability, resistance to soiling, and UV stability.

Structure



where $\text{Rf} = \text{F}(\text{CF}_2\text{CF}_2)_y$
 $x = 0$ to about 15
 $y = 1$ to about 7

Applications

Graphic Arts

Pigment compatibility in inks, improved cylinder life in print equipment, and better print definition.

Paints and Coatings

Improved antisoiling, antifogging, UV resistance, compatible with most aqueous- or solvent-based paints.

Polymers

Internal lubricant, antifogging, reduced plasticizer migration, coupling agent for fillers, UV resistance, antisoilant.

Adhesives

Tackifier modification, improved wetting, compatible with most aqueous- or solvent-based adhesives.

Waxes and Polishes

Improved wetting, enhanced leveling, reduced cratering, compatible with most aqueous- or solvent-based waxes and polishes.

Metals and Electronics

Improved etching efficiency, plating bath aid, and zinc battery scale inhibitor.

Caulks

Improved UV stability, antisoiling, and weatherability, elimination of silicone bleeding, compatible with most aqueous- or solvent-based caulks.

Physical Application Properties

Solubility

- 0.1% in water and methyl chloroform
- >2% in isopropyl and methyl alcohol, acetone, ethyl acetate, and THF
- Insoluble in n-heptane and toluene

Specific Gravity at 25°C (77°F)

- 1.17

Density at 25°C (77°F) (lb/gal)

- 10.8

Zonyl® is a registered trademark of DuPont.

Surface Tension in Deionized Water at 25°C (77°F)

- 22 dyn/cm at 0.001% active ingredient
- 19 dyn/cm at 0.01% active ingredient

Foaming/Defoaming

- Effective defoamer but not effective as a foamer
- Ross Miles Foam Volume, mL at 41°C (106°F)

	DI Water	300 ppm Ca
Initial	74	35
10 min	63	24

Emulsifying (especially Halogenated Materials)

- Effective

Wetting

- Highly effective

Detergency

- Not effective

Dispersing (especially Halogenated Materials)

- Effective

Compatibility

- Widely effective in solutions with high or low pH and high or low hard ion (polyvalent cation) concentrations

Product Properties

Appearance

Light brown liquid. Melt completely, and mix thoroughly to ensure representative sampling.

Ionic Character

Nonionic

Molecular Weight

~725

Composition

50% fluorosurfactant, 25% ethylene glycol, and 25% water

Flash Point

Not flammable

pH

6<pH<8

Stability

- Stable to freezing. Not classed as hazardous or flammable by DOT
- Chemical stability: 2<pH<12
- Performance stability: 2<pH<12
- Shelf life: 2 yr

Availability

2-oz samples: 8- and 40-lb containers

Personal Safety, First Aid, and Storage and Handling

See the Material Data Sheet (MSDS) for product specific information. Mix well before using.

Technical Assistance

For help in selecting or evaluating these products for your application, please call DuPont's technical service experts at 800-255-4596.

Ordering Information—Product, Literature, or Samples

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EXHIBIT C

DuPont™ Zonyl® FSA

Fluorosurfactant

Description

Zonyl® FSA is a water-soluble, lithium carboxylate anionic fluorosurfactant that gives excellent corrosion inhibition at very low concentrations. Zonyl® FSA is particularly effective at lowering the surface tension of aqueous/air interfaces, which imparts excellent leveling and anti-orange peel performance to water-based paints, waxes, polishes, and coatings. Due to the carboxylate group, Zonyl® FSA is most effective in soft water applications where polyvalent cations are absent.

Structure



where $\text{Rf} = \text{F}(\text{CF}_2\text{CF}_2)_x$
 $x = 1$ to about 9

Applications

Corrosion Inhibition

Outstanding antioxidant for most metal surfaces.

Paints and Coatings

Excellent leveling, reduced orange peel effect, compatible with most aqueous-based paints.

Polymers

Excellent mold release performance, CaSO_4 scale removal, coupling agent for fillers, UV resistance, antisoilant, compatible with most aqueous-based polymers.

Adhesives

Improved wetting of most aqueous-based adhesives.

Waxes and Polishes

Excellent leveling, reduced orange peel effect, compatible with most aqueous-based waxes and polishes.

Physical Application Properties

Solubility

- >2% in water and methyl alcohol
- 0.1% in isopropyl alcohol
- Insoluble in acetone, ethyl acetate, THF, toluene, n-heptane, and methyl chloroform

Specific Gravity at 25°C (77°F)

- 1.03

Density at 25°C (77°F) (lb/gal)

- 8.6

Surface Tension in Deionized Water at 25°C (77°F)

- 48 dyn/cm at 0.001% active ingredient
- 22 dyn/cm at 0.01% active ingredient

Foaming/Defoaming

- Moderate foamer
- Ross Miles Foam Volume, mL at 41°C (106°F)

	DI Water	300 ppm Ca
Initial	100	ppt
10 min	95	ppt

Corrosion Retarder

- Highly recommended

Emulsifying (Halogenated Materials)

- Recommended

Zonyl® is a registered trademark of DuPont.

Wetting

- Highly recommended (leveling applications)

Detergency

- Recommended

Dispersing

- Recommended

Compatibility

- Effective in solutions with low hard ion concentrations only

Product Properties**Appearance**

Brown liquid. Mix thoroughly to ensure representative sampling.

Ionic Character

Anionic

Molecular Weight

~500

Composition

25% fluorosurfactant, 37.5% isopropyl alcohol, and 37.5% water

Flash Point

21°C (70°F) (Pensky Martens Closed Cup).
Flammable liquid

pH

6<pH<8

Stability

- Stable to freezing. Heating is not recommended (see Flash Point data above)
- Chemical stability: 2<pH<12
- Performance stability: 2<pH<12
- Shelf life: 2 yr

Availability

2-oz samples: 8- and 40-lb containers

Personal Safety, First Aid, and Storage and Handling

See the Material Data Sheet (MSDS) for product specific information. Mix well before using.

Technical Assistance

For help in selecting or evaluating these products for your application, please call DuPont's technical service experts at 800-255-4596.

Ordering Information—Product, Literature, or Samples

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EXHIBIT D